According to what we know of the production of the cultivated lands of the Ahaggar itself and according to what the Tuareg are obliged to import, we may know approximately their needs. During the good years, local production is equivalent to only one quarter of the needs. It may be evaluated at 150 tons. To this must be added wheat production, but this cannot be taken in consideration insofar as consumption is concerned, since it is almost entirely destined for export. It follows from this that import needs amount to 4, 000 loads of millet a year, calculated at 150 kilograms each, making 600 tons, which are for the most part bought or exchanged at Damergou or in the Tahoua region. The annual demand for dates is 400 loads.

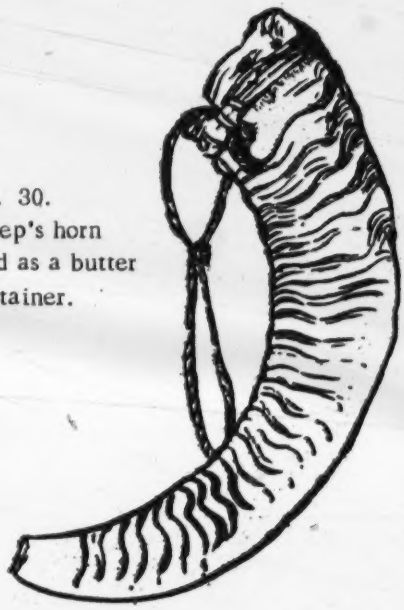


Fig. 30. Sheep's horn used as a butter container.

From these figures it follows that the annual needs per person are approximately one load of millet and one-tenth of a load of dates.

Individual consumption may thus be estimated at 187 kilograms of millet and 15 kilograms of dates per year, while an identical calculation /232/ for the Saharian Arabs has given us 180 kilograms of wheat and 75 kilograms of dates. But we must not deceive ourselves. These figures are drawn up for years, if not of abundance, at least of relative facility. Indeed, the annual average is very much lower, for the Ihaggaren do not always have at their disposal the means of exchange to meet their needs, and one may reduce the figures cited above by a good third, sometimes even by half.

162
103

	1911	1938
T-i-n-Ămenser	36	temporarily abandoned
Tifert	50	" "
Essélésékin	30	
T-i-n-Târâbin	15	abandoned

166
621
[648] These figures bring out the weakening of some centers to the advantage of others. Thus, a number of cultivators from Tarahouhaout (where the French post was formerly located) came to settle at Tamanrasset, and the group of little centers in the outskirts of Ăbalessa, Iglen, Tăfarit, etc., has absorbed the groups from other abandoned centers like Tifert, Essélésékin, Ilâman, Tarahananet, etc.

[241
312] Together these centers number about 400 gardens and 80 feggaguir.

262
439
433 The wheat harvested is partly consumed by the cultivators and chiefly intended for export; it is exchanged at the Touat for dates. The total harvests in the Ahaggar corresponds to only one-fifth of the needs of its inhabitants, even in good years.

621
433 There are fifteen agricultural centers exploited in the Ahaggar: Tamanrasset, Tărhaouahout, Tahifet, Tăzerouk, Ideles, Ăbalessa, Hirhafok, Iglen, I-n-Amegel, T-i-n-Ămenser, Amsel, Tigeneouin, Talan-Tedit, Mertoûtek, and Esselésékine.

[166] In addition there are twenty-two other centers which have been abandoned for some years as a result of dryness or lack of manpower: Ăttoklane, Ădenek, Ămrah, Ăbezou, Ăglil, Bloûmet, Déhine, Dar Mouli, Ennedid, Innezal, Ilâman, In Ămertek, Ilafok, Outoul, Ouhet, Souaïka, T-i-n-Târabin, Touakin, Teberbert, Tarahananet, Tahart, and Joraf.

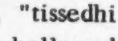
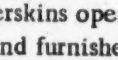
Chapter XI

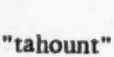
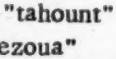
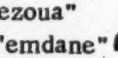
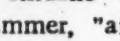
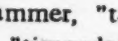
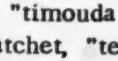
Industry. Blacksmiths

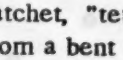
There is no industry in the Ahaggar. They do not exist. 433
One cannot describe as an industry the minor arms repair that 326
a few blacksmiths make, nor the little wooden implements that the Tuareg make for their personal use.

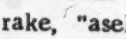
We have seen above that the Ahaggar Tuareg buy all 326
their arms in the Aïr. They are not made at home. [439]

In the Ahnet I watched a blacksmith, Eg Ahnet, work. He was mending spears, sabers, and daggers, and he told me that he also made some jewelry when they were ordered from him. He asked for preserve cans to make his settings. His tools were quite primitive. He had:

A bellows, "tissedhi"  , made of two iron tubes set into a hollowed piece of wood onto which were fitted two waterskins open at the ends. These openings were held by rings and furnished with handles. The iron tubes blew the air into a clay furnace, "anefif"  , set before the fire. /72/

An anvil, "tahount" 
Files, "azezoua" 
Pliers, "ir'emdane" 
A large hammer, "afadhis" 
A small hammer, "tafadhist" 
Tin-snips, "timouda" 

A small hatchet, "tetaout"  , which he had made from a bent branch.

Finally, a rake, "asekredh"  , which he hafted with two wooden handles each time he wished to use it.

He also made locks and keys of copper. He complained [414]
of hard times and how the craft no longer prospered. Where [178]
was the age of the great raids, the expeditions from which arms were brought back to him to repair and sharpen! Where are we going? Times have really changed!

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

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[144]

Fig. 5. Veiled vassal Tuareg. Ayr, the *Imezzureg* tribe.

Fig. 6. Irrigation farmer of the *Iburelliten*, that is descendants of mixed marriages between fair-skinned Tuareg and Negroes. The man is patrilineally releated to the noble *Tuytok* tribe, matrilineally to slaves. Ahaggar, Amsel.

181 and there are indeed many Tuareg both in Ahaggar and in Ayr who wear Islamic amulets which are believed to make the wearers look "great and important". "Prestige" is constantly in the mind of all Tuareg who are much more sophisticated than other people living within their country.

181 Most true Tuareg are nomadic stock-breeders who will not engage in the strenuous work of irriga-
433 tion agriculture. The Tuareg will readily engage in any strenuous work connected with stock-breeding,
461 caravan trading, and in the past also in raiding expeditions, which were organized by people of the nobility, but agricultural work is generally much despised. However, there are in all groups certain families or tribes the members of which subsist predominantly by agriculture, and are nevertheless considered true Tuareg by pastoralists. These agricultural Tuareg will be mentioned in a later chapter,
564 and we shall now pass on to a brief description of various negroid castes and of other non-Tuareg
567 people living within the boundaries of Tuareg territory:—

Iklan (sing. *Akli*). These are the proper slaves who are very negroid. Nicolas believes that the word *Akli* (pl. *Iklan*) is in fact derived from a k-l root meaning "to be black" (Nicolas 1950a, p. 189), but

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

yield decreases to about two litres (Doutressoulle 1947, p. 104). It should be added that, as for other domestic animals, the daily yield of milk depends very much on the conditions of pastures, and cows always yield little milk when pastures are dry – even at the beginning of their lactation period.

Bulls are frequently castrated two or three years old to be used for riding and transportation. Oxen are used for this purpose particularly among the Tuareg of the plains towards the south and west, while most pastoralists of the Massif almost exclusively use donkeys and camels. Oxen are ridden without a saddle. The rider sits on the back of the animal which is covered with a blanket or a piece of cotton as in Ahaggar. The animals have a cord (*asabar*) placed through their nostrils, but plaited halters (*amerar*) are also used for riding oxen.

The Tuareg have terms to cover the age and sex of their cattle, and they also have a certain number of colour terms; but they say that there are very few colour terms for cattle (about ten terms according to Tuareg of the *Kel Ferwan* group). They explain this lack of colour terms by the fact that cattle did not play any important rôle to their subsistence in the past. Cattle do not respond to their names, but some of them will come to the camp on the utterance of a certain cry (cf. p. 135).

Fig. 31. Zebu calf with a pronged stick (*tabellut*) put through its nostrils to prevent sucking. Ayr, the *Isakaramen* tribe.
Fig. 32. Muzzle (*akimbab*) to wean zebu calves. The muzzle is made of boughs of the *tamat* acacia (*Acacia flava*) which form a frame covered with cords of *tamat* bast and with cotton strips. It is fastened to the head of a calf with a piece of cord plaited of goat's hair, and the attachment is done in such a way that the calf can graze without difficulty though it cannot suck. Tamesna, Ahaggar Tuareg of the *Ireǧenaten* tribe. Dimension: 0.17–0.19 m high. (N. M. G. 6661).

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

CAMELS

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Camels are very important domestic animals in all Tuareg groups, and they also play a great part in the subsistence of most Arab pastoralists of the Northern Sahara. The common Arab camel breed, which is known to the Tuareg as *marroki*, is also found in Northern Tuareg country – particularly among the *Kel Ajjer*. It is heavily built and is extremely well fitted for transportation. It is a very strong breed in spite of its relatively low stature, and it has large feet which is considered an eminent quality for pack camels. This *marroki* camel has a thick cover of wool on the hump and on the fore-part of the body, while Tuareg camels, which are of higher stature and more elegantly built, in general have little or no wool, but only a short coat of hair much like that of cows and horses. Tuareg camels may have long hairs around the hump but true Tuareg camels have no proper coat of wool. Though the *marroki* breed is excellent for transportation and is considered a better milch-animal than the southern Tuareg breed, the Tuareg generally prefer their own elegantly built camels, and they look down upon the heavily built camels of the north. However, as mentioned, there are some *marroki*

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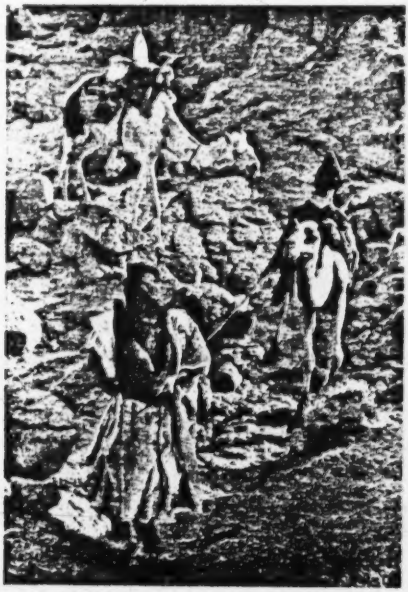

Fig. 33. Tuareg with riding camels. Ahaggar, the *Aguh-en-tehli* tribe.

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

bridge of the nose of a calf, so that it hurts its mother when it tries to suck (Cauvet 1925, I, p. 359). – (3) *akimbab*, that is a plaited muzzle which allows the calf to graze, but prevents it from sucking. I have been told both in Ahaggar and Ayr that such muzzles are used for camel calves, but apparently they do not constitute a normal weaning method. – (4) *asedres* or *ameru* are said to be synonymous terms for the weaning method generally adopted among the *Kel Ferwan* Tuareg of Ayr. The method is as follows:— The upper lip of the calf is pierced on both sides of the harelip so characteristic of all camels. A piece of thin root of the *afagag* acacia (*Acacia Raddiana*) is drawn through these holes so that the ends of the root protude at both sides, and a knot is made at both ends that the root will not fall out. These knots hurt the udder of a she-camel when the calf starts to suck, but this is not the real idea of the device. For the root-piece keeps the pierced holes open and the calf is therefore unable to suck at all.

A she-camel may yield about ten litres of milk at the beginning of its lactation period, but at the end of this period it does not yield more than two or three litres even with good grazing. The yield is always dependent on grazing conditions. Thus during my stay in Ahnet and Ahaggar 1954–55, a Tuareg who owned about twenty she-camels acquired only two litres of milk a day in all from these animals. But conditions of camel-breeding are much better in Ayr and in the southern plains where she-camels are tolerably good milk-yielders most of the year, and camel's milk is therefore very important to some pastoralists of these regions. Camel's milk is drunk and not generally used for food in other ways. It is much esteemed by all Tuareg, who claim that it possesses a particular power and gives strength. It is never stored in the shape of butter or cheese. The Tuareg of Ahaggar and Ayr never eat camel's butter which they consider possesses a poor taste, and, besides, it is very difficult to churn. They make butter of camel's milk only when butter of milk from other domestic animals is lacking for the greasing of the hair. Both in Ahaggar and in Ayr butter is then churned by the men in a rather peculiar way:— A skin bag containing an amount of camel's milk is attached to the riding saddle of a camel which is then ridden at very fast speed for some time. But even with this method, it is said, camel's milk gives very little butter, and it is also definitely stated that the milk cannot be used for cheese-making. These Tuareg statements seem to be confirmed by analyses of veterinaries, who claim camel's milk to contain very little casein, and it has been proved difficult to separate butter from camel's milk (cf. Cauvet 1925, I, p. 707 ff.).

She-camels can mate and yield milk until an age of about 25, and their average length of life is estimated by the Tuareg at about 30 years. But pastoral Tuareg do not generally keep their camels until they die a natural death. In Ayr I was told that she-camels more than twenty years old should be sold or killed. Most Tuareg sell their old camels in the oases of the Central or Northern Sahara where a large population of sedentary farmers is constantly yearning for meat. Very few camels are killed by the butchers of Agadez, where meat from oxen, sheep, and goats is always available and fairly cheap, but a great many old camels are slaughtered at the market places of the oases further north.

Pastoral Tuareg of Ayr very rarely kill their own camels to eat them. They will slaughter a camel which suffers from some severe disease as all animals dying by accident or from disease are unlawful to eat. However, there are also some Ayr Tuareg who will never eat camel's meat. They say that they would feel very sick at heart were they to do so, and some Tuareg even say that they would vomit

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

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Fig. 117. Fishing pool (*aɣelmam*) in Tasilé-n-Aljer.

136 sunset. There are wild pigeons by the thousand and innumerable flocks of guinea fowls and partridges (*Alectoris* sp.). Two species of turtle-dove are almost as common in Ayr as is the sparrow in Europe.

224 Possibilities of hunting are much more favourable in Ayr than in Northern Tuareg countries, yet, 410 nevertheless, the Ayr Tuareg engage even less in hunting than do the Ahaggar Tuareg. One reason for this is perhaps that very few Ayr Tuareg possess guns. It is extremely rare to meet hunters in Ayr.

224 They are found mainly within one tribe, namely that of *Imedderaren* (or *Kel Tamgak*) living in the 133 Tamgak Mountains of Northern Ayr. I have myself never visited camps of these people, but all Tuareg 119 agree that they live largely as hunters and possess few domestic animals. Unfortunately, these people have never been studied in detail. Buchanan, who met a hunting band of these Tuareg in 1920, says 222 that they have neither goats nor grain, but live by hunting and the collection of wild edible plants (Buchanan 1921, p. 191), while Campbell, who met them at Iferwan in 1926, describes them as hunters who also breed goats and sheep (Campbell 1928, p. 204 f.). Rodd also states that the *Kel Tamgak* have goats and sheep, but that they do not possess camels (Rodd 1926a, p. 307). This is in agreement with information gathered by myself at Iferwan where I met a few Tuareg of this group. There are

224 no Ayr Tuareg who live exclusively by hunting and collecting. The number of game animals killed

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

222 Even in good years it may happen that edible seed-plants are eaten by locusts before they become
[134] ripe for collecting. Collecting is of secondary importance to the Tuareg of Ahaggar though to most
[433] pastoralists it is more important than hunting.

AYR

134 We have seen that Ayr has better grazing grounds and more game than Ahaggar, and it is only
137 natural that this southern area is also a more favourable one for the collecting of wild plants. Never-
222 theless, it seems as if collecting is not so important to the Ayr Tuareg who have more livestock for
[433] which millet and wheat can be obtained without much difficulty. The number of edible plants utilized in Ayr is probably a very large one. Thus it is said that certain *Kel Ewey* Tuareg collect many different plants, but my inquiries into the methods and the value of collecting were limited to Tuareg of the *Kel Ferwan* drum-group of Southern Ayr where the following species are collected for food: —

222 *afagag* (*Acacia Radkiana*). Pods of this acacia are dried and, after pounding in a large millet mortar,
262 mixed with milk to be eaten or drunk like the Tuareg dish known as *agejira* (cf. p. 245 f.).

252 *ebezgin* (*Salvadora persica*). Fruit is eaten without any preparation.

tadent (*Boscia senegalensis*). Berries are pounded in the millet mortar to obtain the limpid juice which is added to porridge.

[824] *tagayt* (*Hyphaene thebaica*). The dum palm, which is of extreme importance for the handicraft of the Ayr Tuareg, is also valuable as food. The young nuts are opened with a knife and the kernels are eaten. The old nuts have an edible outer coating which is eaten by children and even by adults when they are hungry. These old nuts are also pounded in the millet mortar together with seeds of *ageruf*, cf. below.

afezu (*Panicum turgidum*). This perennial grass is very abundant all over Ayr. Collecting of its seeds is done by rubbing the ears of the grass between the hands to allow the seeds to fall into a plaited bowl. Seeds are pounded in a millet mortar to be used for porridge.

ichiben, that is seeds of an annual grass – apparently identical with *Panicum longiflorum* and/or *P. spinosa*. The seeds are collected in two different ways: — (1) If the ripe seeds have fallen to the ground they are swept together with a bunch of straw. (2) The ears are cut with a knife to be threshed by pounding in a millet mortar. — The seeds are highly esteemed, being collected to a greater extent than seeds of other wild plants. The seeds are used particularly for porridge, but also for certain other dishes such as *agejira* (cf. p. 245 f.).

ichit (*Eragrostis* ssp.). A grass yielding red seeds collected in the following way: — The ears are beaten with the hands so that the seeds fall into a plaited bowl. The seeds are used only for porridge.

wajeg (*Cenchrus catharticus* & *C. Priouri*). Annual seed-plants with thorny seeds. The dry plants are beaten with a stick and the fallen seeds are collected in a heap to be threshed with a stick. The seeds are pounded in a millet mortar for porridge.

ageruf (*Tribulus terrester*). An annual plant with thorny seeds which are collected as just described for the *wajeg* plants. The seeds are pounded in a millet mortar to be eaten without further preparation

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

a dish known to the Ayr Tuareg as *téderka*. For this purpose the pounded seeds may also be mixed with pounded dum palm nuts.

acheyor (*Sorghum virgatum*). A tall grass the seeds of which are swept together when fallen to the ground. They are used for porridge.

agazagi. Edible seeds of a grass. They are swept together when they have fallen to the ground, and are used for porridge.

agedagedu. Seeds of an annual plant. When they have fallen to the ground they are swept together by means of a straw bundle. They are pounded in a millet mortar to be eaten as *téderka* without any further preparation.

malokhiya (*Corchorus tridens*). A plant growing in the bush though also grown in gardens. The leaves of this plant are dried and thereupon pounded in a millet mortar to be used as an admixture to porridge-sauce.

abezey (*Cassia tora*). Leaves of this plant are plucked with the hand, or, if the plant is dry, shaken into a plaited bowl. They are pounded and used as an admixture to porridge-sauce.

kat'aket'i (*Cistanche* sp.). It is said to be known as *achellewen* among Tuareg of the *Kel Ewey* group. The edible roots of this plant are dug out with a stick. They are pounded and boiled for a kind of porridge.

acheku (*Glossonema Boveanum*). An annual plant with small lacteal fruit which is eaten as a relish without any preparation.

These are the plant species collected by the *Kel Ferwan* of Southern Ayr. It may happen that some of these plants are destroyed by locusts, but in most years there are excellent possibilities of collecting wild seeds. Most plants are collected late in summer after the rains (at the season of *rarat*), or in winter (*tigresi*). It is said that in good years more than a thousand kilos of wild seeds can be collected by the members of a single household, but even this amount of wild seeds does not answer the need for vegetable products. Collecting is of secondary importance to the *Kel Ferwan* Tuareg. Very few of the plant species mentioned are collected if there is abundant millet. The main exceptions are the plants used for sauce-admixture, and the *ichiben* seeds. The latter are collected even by Tuareg who have enough millet, because porridge made from these seeds is considered a very delicious dish.

The two groups of Northern Tuareg and also the Tuareg of Ayr acquire their vegetable food products mainly from agriculture, which occupation will now briefly be described.

[text continues on p. 183]

Agriculture

In the present chapter are described the agricultural techniques as I know them from Ahaggar (Tasilé-n-Ajjer) and from Ayr, and the economic role of agriculture to the subsistence of pastoral Tuareg is discussed. 241

CULTIVATION WITHOUT ARTIFICIAL IRRIGATION

In the Sahara farming is almost exclusively based on artificial irrigation, and agriculture and stock-breeding are largely separated industries. Large-scale stock-breeding necessitates migrations, while irrigation agriculture must be practised by people who live on the same spot almost continuously. But nomadic stock-breeding and shifting cultivation are occupations which go well together at the borderland of steppe and desert in the north where nomads or semi-nomads sow wheat and barley. Lyon says that the bedouins of Tripolitania use a rude plough but more generally a hoe (Lyon 1821, p. 44). However, plough cultivation seems to predominate among the northern nomads nowadays. Shifting plough cultivation is an important subsidiary occupation for most northern nomads in an almost unbroken area between the Atlantic and the Nile or the Red Sea, but it does not penetrate very far into the true desert country. In Algeria I have not seen shifting cultivation practised further south than the oasis of Ghardaya, where nomads under favourable conditions of rainfall sow wheat and barley by means of a simple plough made of a forked piece of wood (Nicolaisen 1950, Fig. 9, p. 70; Capot-Rey & Marçais 1953, pl. II,5 p. 47, Fig. 6 p. 54). West of Ghardaya the plough is known as far south as Tinduf and Beni Abbes, while it is known at Brak of Central Libya towards the east (cf. Capot-Rey & Marçais 1953, map p. 40). Feilberg in one of his early works stated that the plough in Northern Africa is particularly attached to shifting cultivation as a sowing implement (Feilberg 1931, p. 199 ff.). This is in agrement with my own investigations in the Northern Sahara, and it is confirmed by the very remarkable study of Capot-Rey & Marçais, who state that the plough is *not* fitted irrigation agriculture of the Sahara because of the many fruit trees, notably date palm trees, and because of the whole complicated irrigation system (Capot-Rey & Marçais 1953, p. 51; Feilberg 1931, p. 199). But there seems also to be another reason why the plough is found only in the Northern Sahara: It is particularly fitted for the sowing of wheat and barley, but less suitable for the sowing of millet and sorghum which are the most important cereals grown in the south (cf. Capot-Rey & Marçais 1953, p. 51; Feilberg 1931, p. 201). Barth records that he saw a kind of plough at Auderas in Ayr. It was drawn by three slaves who were driven like oxen by their master (Barth 1857, I, p. 424). 433 171 241 [567] [p. 183]

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

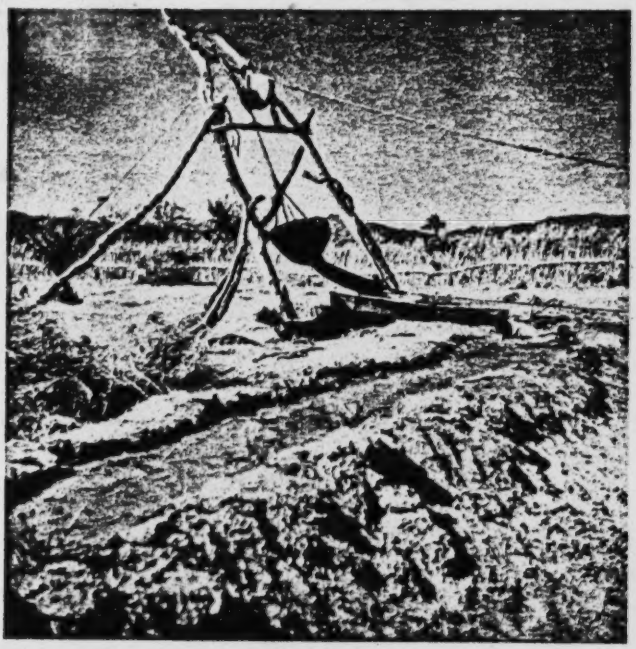

Fig. 132a. The irrigation system known as *sanat*. Ahaggar, Amsel.

settlements contain less than 300 individuals, the majority not even a hundred (cf. Lhote 1955a; p. 292). Most agricultural settlements comprise only a few houses built of stone or mud, or a few straw-huts (cf. p. 327 ff.). The agriculturists of these small settlements generally keep some goats and sheep, have donkeys, which are important beasts of burden to all farmers of the Sahara oases, and in certain families there are one or two zebus to raise water from irrigation wells. A few agriculturists may be characterized as semi-nomads. This is the case of some inhabitants of Abalessa who guard their flocks at some distance from the village. Some of these agriculturists, who were formerly Tuareg slaves, even make skin-tents like pastoral Tuareg.

The subterranean aqueducts known to the Arabs of the Sahara as *foggara*, to the Tuareg as *ifelan* (sing. *éfeli*), constitute by far the most important irrigation system used in Ahaggar. However, these *foggara* canals cannot be compared with the large extensive aqueducts of Tidikelt though their introduction to Ahaggar is due to the immigration of agriculturists from that area. The Tidikelt *foggara* are very large aqueducts which are dug into water-bearing strata which can be situated at a considerable distance from the oasis (cf. Capot-Rey 1953a, p. 324 ff., Lô 1953 & 1954; Chaintron 1958). The Ahaggar foggara are generally very short (about one to two kilometres, or shorter), they are not

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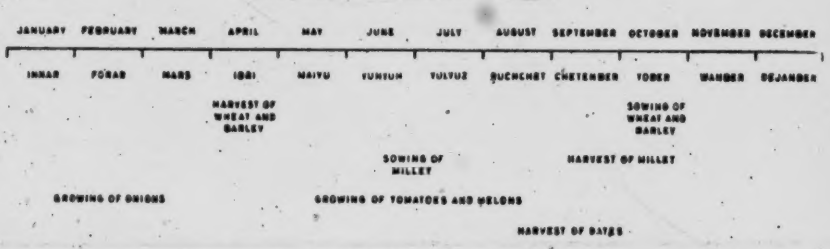

Fig. 139. Horticultural calendar from Ahaggar.

The Tuareg and the negroid agriculturists have a lunar calendar of twelve months corresponding to the Arab calendar, but a lunar calendar has no practical value for the indication of seasonal agricultural activities. The Julian Calendar is known to some people of Ahaggar as well as to other Berbers of the Sahara and the Atlas. Tuareg names of Julian months are given above. Very few people in Ahaggar know the exact beginning and the end of the twelve Julian months, but a few names are used as seasonal terms: *innar* = "midwinter", *mars* = "beginning of spring", *ibri* = "early harvest" (of wheat and barley), *maiyu* = "beginning of summer", *tober* = "late harvest" (millet).

which no definite figures can be given, while the yield of fruit trees growing in the garden plot does not necessarily belong to the agriculturist. These trees frequently belong to pastoral Tuareg.

I think it can be estimated that an agricultural household with its own garden produce about a thousand kilos of vegetables food products annually for its private use. We can add that though the members of an agricultural household live mainly on vegetable food products they also acquire a certain amount of food from livestock, which normally comprises a few goats and sheep, and perhaps one or two zebus. Conditions of stock-breeding are not always favourable to people who live continuously on the same spot, but it is advantageous to the agriculturists of Ahaggar, who live close to valleys with some pasture, that they are able to feed their animals on green garden products when pasture is badly developed and thus avoid the disaster of a drought. It is also an advantage to most agriculturists that they do not have to water their animals which can drink freely from the irrigation canals. The agriculturists can kill a few goats or sheep annually, they obtain milk and a little butter to be used mainly as a sauce for bread and porridge, and they make cheese of the *awles* type (cf. p. 224), but they never make cheese from fresh milk as do many pastoral Tuareg when milk is abundant. The agriculturists also breed fowls and pigeons, and some of them have an important meat supply from hunting with steel-traps (hares, jackals, fennecs, and ravens). Collecting, on the other hand, is of little or no value to irrigation farmers of Ahaggar.

The economic position of agriculturists who work without any particular obligations towards pastoral Tuareg is tolerably good. It is less favourable to those who grow winter crops also on behalf of the Tuareg, as do most cultivators. Some of them irrigate the garden plot with water raised from wells by oxen which may belong to the cultivator or to the Tuareg. But most agriculturists who work for the pastoral Tuareg irrigate by means of *foggara*. It is very strenuous work to dig a *foggara* canal, and co-operation is needed not only for this but also for the maintenance of the whole irrigation system. The gardens are individually tended by the agriculturists, who co-operate in the *foggara* work under the leadership of a headman known as *amɣar n efeli*, that is "chief of the *foggara*". This headman is

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obtain a larger amount of vegetable food products and more wheat and barley. The pastoral Tuareg gain less from their gardens than they did when the *khamast* system prevailed, but it is still profitable for them to be garden owners.

The quantity of agricultural products anually consumed per person among the *Kel Ahaggar* is estimated by Lhote at 187 kilos millet, 15 kilos dates, and a small amount of wheat for which no figure is given. For Arabs of the Sahara the quantity of vegetable food is estimated at 180 kilos wheat, and 75 kilos dates anually per person (Lhote 1955a, p. 263). I add to this that wheat is used for bread to a very large extent by the Ahaggar Tuareg, who also make much use of barley for bread and porridge. According to Malaurie the amount of agricultural food products available per person among the Ahaggar Tuareg is about 400 grammes a day, or 146 kilos anually (Malaurie 1953, p. 342). It should be noted again that the amount of agricultural food products necessary for a Tuareg household varies greatly from one year to the other. In years of drought when agricultural products form so to speak the only source of food for the nomads, they estimate that a household consisting of husband, wife, and one child will consume about two kilos of cereals (dates) every day, or 730 kilos in a year. Consequently the amount of cereals and dates consumed anually per person may in dry years rise to about 245 kilos. This seems to correspond to the amount of food considered necessary for Arabs of Tidikelt and Tuwat, who live almost exclusively on cereals and dates. When employed as labourers by the French Administration these sedentary Arabs are given 16 kilos of wheat and 4 kilos of rice a month, or 240 kilos of agricultural products anually per person (Information obtained from the administration office of In Salah in 1954). The agricultural products obtained by a pastoral household from a single garden will not meet the needs of the household and its slaves even in years of good grazing, and less so in dry years when pastoralists subsist entirely on agricultural food products. I give an example: During the year 1954 55 which was extremely dry, a Tuareg who owned three gardens cultivated with an *aril* agreement could not feed his household and his slaves (comprising two men, two women, and three children from five to twelve years old) by means of his own garden products. The Ahaggar Tuareg depend on caravan trading for their provisions of agricultural food, and trading also helps them to create the capital of millet and dates which is invested in their gardens in Ahaggar grown on their behalf by agriculturists. I believe that most pastoral households of Ahaggar have gardens, but there are Tuareg who have none. This is true, for instance, of most Tuareg living in and around the Ahnet Massif. Tuareg of this region formerly had gardens irrigated by the *foggara* system at Abalessa, but to-day they acquire their vegetable food products mainly by caravan trading.

IRRIGATION AGRICULTURE IN AYR

The largest aggregation of sedentary people in Ayr is found in Agadez (4.737), which is inhabited almost exclusively by negroid peoples who speak Hausa though most of them also know the Tuareg language (*tamachek*). This large sedentary population mainly lives on trade and on crafts of various kinds. The inhabitants are known to the Tuareg as the *Imeggedezen*. They are said to be related to the Sultan (or the *Amenukal*) of Agadez. There is a tradition which claims that the Sultan came

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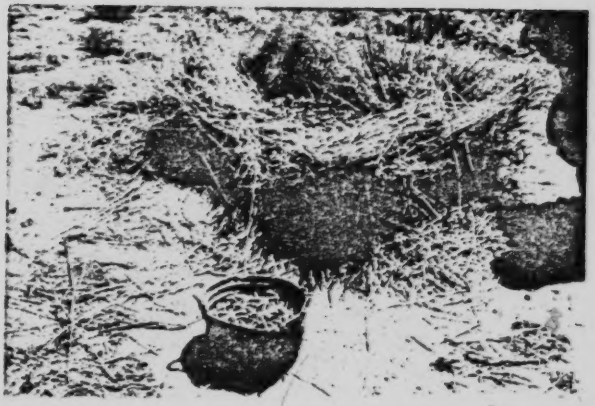

Fig. 142. Tomatoes (*tomatem*; *Solanum lycopersicum* and a type of melon (*tazenut*; *Cucurbita* sp.) cut into slices and left upon a layer of straw for drying. A basket (*tésenit*) filled with ears of millet (*énélé*) is seen in the front. Ahaggar, *Ahl Azzi* Arabs.

513 from Constantinople, and the true *Imeggedezen*, it is said, came from the same region. They were
173 kinsmen of the Sultan who came to see their relative Sultan as guests or visitors and therefore acquired
[361] the name "*Imeggedezen*". They founded the city of Agadez, though it is said that sedentary people of the *Itésen* group of Tuareg were already living at this place. The city of Agadez seems to have been founded in the 15th century shortly after the foundation of the Sultanry which was established 1405
361 A.D. (cf. p. 414 f.). I shall return to the problems connected with the establishment of Agadez in a
621 later chapter, and shall here content myself by saying that Agadez was established as a trading post, which also became the seat of government of Ayr, and the town never seems to have been a true agri-
[312] cultural settlement. There are no gardens, and even drinking water is very scarce and fetched by the
[563] women from outside of the city at wells and in river beds. The *Imeggedezen* are mainly city dwellers though there is a small population of agricultural *Imeggedezen* that possesses gardens at Alarses, a few kilometres north-east of Agadez.

197 In Barth's days the main language of the sedentary Agadez population was *Sonray* (Barth 1857,
563 I, p. 504). This is still spoken by a few people within the city, and it constitutes the traditional language
361 of the people inhabiting the oasis of Ingal (1.430) west of Agadez. These Sonray-speaking people of
162 Ingal, known to the Tuareg as *Isaweren*, subsist mainly upon their palms which yield dates of an
563 excellent quality, and they do not otherwise engage much in agricultural activity. In the winter season
433 some of these people settle in Tegidda-n-tésemt towards the north to work in the salt pits. Trade and
245 crafts are also important industries to the sedentary people of Ingal, which owns a market.
221
463 Throughout the Ayr Massif there are many agricultural villages in which the farmers live in straw-
361 huts, and in houses built of stone and mud (cf. p. 327 ff., Figs. 246 ff.). Most people of these villages
342 belong to the group of *Kel Ewey* Tuareg, but there are also some agriculturists who belong to other Tuareg
162 groups, e.g., the *Itésen* (cf. p. 330, 412, 414, 417 f.). The *Kel Ewey* Tuareg originally came from the north
162 as true fair-skinned Tuareg, but in Ayr they mixed with an ancient negroid and Hausa-speaking popula-
144 tion that subsisted on agriculture
433
[174]

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tion that subsisted on agriculture. Most members of the *Kel Ewey* group are fairly negroid in appearance, and though some of them lead a nomadic life and subsist mainly on stock-breeding, the bulk of the *Kel Ewey* are sedentary agriculturists who have some livestock comprising goats, sheep, zebus, and sometimes camels also. Among the fair-skinned Tuareg of the *Kel Ferwan* drum-group there are very few sedentary agriculturists, though a few vassals have taken up irrigation agriculture in recent times. There are also agriculturists within the negroid group of the *Kel Ferwan* known as *Iṛawḗlen*. Some *Kel Ferwan* Tuareg have gardens cultivated by their slaves, but this is not customary nowadays when slavery is of little importance in Ayr. Contracts between pastoral Tuareg and cultivators are said to have been unknown until recent times when a few pastoralists have made contracts with cultivators. There seem to be no fixed systems regulating such relationships, but it is said to be common for the cultivator and the Tuareg to divide crops equally between them.

Though agriculture could be practised in Ayr without artificial irrigation there are no rain-grown crops within the Massif nowadays. The *foggara* system is unknown, and irrigation is done by raising water from shallow wells. The system of a pole and bucket provided with a counterweight known in Ayr as *aseftan* has disappeared quite recently. It was used at many agricultural settlements of Ayr until a few years ago, and in parts of the country formed the only type of irrigation system at the time of the French occupation. One informant told me that in his boyhood about 35 years ago no other irrigation method was employed at Alarses, and this is in agreement with literature (cf. Capot-Rey 1953a, p. 322). At that time, however, the method of raising water from wells by animal traction (in Ayr *amu*, in Ahaggar *tanut*) was also practised at many settlements. It is unknown when it came to Ayr, but it is said to have been introduced from the north – probably from the regions of Fezzan and Tasilé-n-Ajjer from where the same system came to Ahaggar (cf. p. 187). It is now used at all settlements as the only type of irrigation system, and zebu-oxen are always used for traction. This was not so in the past when zebus were less common than to-day, and it is said that donkeys were then the common draught-animals. The irrigation of gardens is performed in much the same way as in Ahaggar. The water raised from the shallow well (*amu*) is led through a narrow canal (*ayeial*) to a large basin (*tisemt*) from where another canal (*dakl*) leads to the garden (*afarag*), which is divided into a number of beds (*ḍfenṛal*).

Cereals form the most important crops in Ayr. The common winter crop is wheat (*elkamu*; *Triticum vulgare*), but also barley (*Hordeum tetrastichum* var. *pallidum*) is very widely grown. One crop of these two cereals is taken every winter, and it is said that the period of growth is about five months; sowing is done in October, harvest in March. Cereals are also important for summer crops. Both millet (*énélé*; *Pennisetum typhoideum*) and sorghum (*abora*; *Sorghum caudatum*) are grown, and millet, as we have seen, has a very short period of growth – only about two months (cf. p. 184). But though millet is most important as food for agriculturists and pastoral Tuareg alike, it is not widely grown because it is difficult to protect it from the numerous small birds and because, it is said, millet grown in Ayr is of a quality inferior to that of the Sudanese type. Most of the millet eaten in Ayr is therefore imported from Damergu by pastoral Tuareg. By far the most important summer crop grown in Ayr is maize (*Zea mays*), which is known to the Tuareg as *abora maser*, that is "Egyptian sorghum" (*abora* = sorghum; *maser* = Egypt) (the name *maser* is also used to designate the white cotton used for garments

Caravan Trading

Caravan trading of the Sahara has suffered severely from the European colonisation of Northern Africa. The establishment of ports and railways in the Sudanese area and the abolition of the slave-trade have brought to an end the large caravans passing through the desert. In recent times another heavy blow has been struck against the caravans, for transportation is more and more taken over by trucks which can easily pass through the open desert country. Many pastoralists of Northern Africa suffer from the decline of their trade, which for centuries has been an important stabilizing factor for their subsistence. The decline of caravan trading is also strongly felt in the oases, which have played a very important part as trading posts or trading stations. Some of these oases have far fewer inhabitants nowadays than in the past, and it is most difficult for many sedentary people of the oases to exist. The decline of the trade has been felt also among the pastoral Tuareg. But caravan trading is still important to most of them, and many of them could not support life without it. To understand the important role of caravan trading we have once more to return to the economic values of subsistence activities.

CARAVAN TRADING OF THE AHAGGAR TUAREG

The Ahaggar Tuareg cannot live exclusively on stock-breeding products all the year round – not even in good years when annual pasture is well developed in autumn and early winter. Even in a good year the nomads mainly eat vegetable food throughout the hot season, and some bread or porridge is also consumed during the period of abundant milk yields. It is true that nomads can subsist entirely on milk for long periods, and that some people do so for weeks or even months. Galan says that pastoralists of of Ahaggar, when they live entirely on milk, can do with four litres a day per person (Galan 1951, p. 231). But it is estimated by the Ayr Tuareg that they need about eight or ten litres a day to live entirely on milk, and they all claim that they get weary from constant milk drinking. They say that though they do not feel hungry when they live exclusively on milk they experience a peculiar, unpleasant feeling in the stomach. The relative importance of stock-breeding products (mainly milk) and vegetable food (mainly wheat, millet, and dates) may be seen from the diagram Fig. 151.[1] In a good year there is normally some possibility of collecting wild seeds for bread and porridge, but the Tuareg claim that they cannot easily cover their need of vegetable products even in a year when milk is abundant. And milk is not always abundant. We can estimate that for two or three good years

[1] [cf. p. 216] [p. 209]

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there will be one entirely dry year throughout, during which stock-breeding products have little or no value as food, and in such years of dry pasture there will also be very few wild plants to collect. Hunting, which plays little part for most Tuareg nowadays, is also of little value in an entirely dry year when many game animals die or migrate to other regions with more favourable pasture. It would seem obvious for pastoral Tuareg to do the same and to take their animals to grazing grounds outside of Ahaggar – particularly to the southern plains where pasture is normally better than in their own country. We have seen that most Ahaggar Tuareg in bad years have their she-camels far from Ahaggar in the Tamesna plains or in the country north of Aḏraṛ-n-Foṛas. We have also mentioned that, under very severe conditions, camps of Ahaggar and Ahnet may move to these southern regions with their flocks, though extensive goat-migrations are not always profitable. But most Tuareg remain in Ahaggar even in very dry years with their camps and flocks. Some of the animals will die, and none of them can be mated so that the flocks may rapidly decrease. During such years of drought the Ahaggar Tuareg live so to speak exclusively on agricultural food products of which they get only a part from their gardens grown by sedentary agriculturists (the *Ḥarratin*, or *Izzegaren*). It is mainly through caravan trading that the Ahaggar Tuareg acquire their vegetable food products. Their two important trading expeditions to the Tidikelt oases and to the Sudan are carried out anually for the main purpose of acquiring dates and millet.

Trading with the Tidikelt oases (Awlef and In Salah) is based mainly upon a surplus of goats, camels, butter and cheese, and on dried meat. But many Tuareg who obtain large amounts of millet from the Sudanese trading expedition also sell part of their wheat grown in their own gardens in Ahaggar, and Sudanese articles bought during their south-bound trading-expedition. In a dry year some Tuareg may choose not to visit the Tidikelt area as they have too small a surplus for trading. The south-bound caravans, on the other hand, are rarely prevented from going as their main trading object is rock-salt of an excellent quality mined at Amaḏror north-east of the Ahaggar Massif. Both north-bound and south-bound caravans will set off in autumn when the hottest season has come to an end, that is at the end of September or at the beginning of October.

The caravan route from Tamanṛaset in Ahaggar to In Salah in Tidikelt is about 750 kilometres, and the route is rather difficult because pasture is normally lacking for three to four days of the journey. Most Tuareg who cross this part of the desert therefore bring with them large supplies of the dried *tulluli*-grass (*Aristida pungens*), which also serves as fodder for the pack-camels during the stay in the oases around which there is little pasture. The journey takes about twenty days in each direction, and the north-bound caravans return to Ahaggar again already in December or in January. The traders return with their camels loaded with dates of which a part may be re-sold in Ahaggar (Tamanṛaset), but they also buy European cotton and other European articles, which are cheaper in the north, and woollen blankets woven by sedentary people of the northern oases.

The south-bound caravans are very extensive. The towns visited in the south are Agadez, Tawa Tanut, and Zinder. The distance from Tamanṛaset to Zinder is, as the crow flies, about 1200 kilometres, while the distance from Tamanṛaset to Amaḏror, where salt is mined, is about 300 kilometres. In total the caravan journey from Ahaggar to Zinder and back again for many Tuareg amounts to more than 3000 kilometres. The south-bound caravans are organized as follows:— Slaves take the

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Fig. 149. The market place of Agadez. In the front negroid Hausa men roasting small pieces of meat on a spit; in the background Tuareg camels offered for sale.

484 pack-camels to the salt pit of Amadror to mine salt in the hot season. They load the camels with salt
487 and bring them to the camp where further preparations for the journey are made. When the caravans
[317] have started southwards they stop in the Tamesna plains and rest there for at least one month to allow
[437] the pack-camels to feed on annual pasture, and, if necessary, to exchange the pack-camels with others kept by the Ahaggar Tuareg in Tamesna. Thereupon the caravan will continue towards the millet-
[22] growing towns and villages of the Sudan to bargain with the Hausa. The caravan returns to Ahaggar again at the end of March or at the beginning of April, so that the total duration of a south-bound caravan is up to six or seven months.

433 The Sudanese millet trade is of extreme value to the subsistence of the Ahaggar Tuareg. It is particularly important to their economy that they obtain millet for non-nomadic products transported by camels, which are mainly bred outside of Ahaggar. The millet trade is consequently not much influenced by Ahaggar's changeable climate. According to official statistics, the Ahaggar caravans in 1946 exported 375 tons salt, and imported 720 tons millet, while the cereals grown in Ahaggar amounted to 197 tons (cf. Malaurie 1953, p. 344). According to Galan vegetable food grown in the gardens of Ahaggar in 1950 (a bad year) amounted to 121 tons wheat, 5 tons millet and barley, and 4 tons of tomatoes – about 10 kg of wheat and 0.5 kg of millet, barley, and tomatoes per person (Galan 1951,
[418] p. 233). We see from this that the amount of cereals acquired in the Sudan far exceeds the amount grown in Ahaggar, and as we have mentioned, the millet trade is also important for the establishment of Tuareg agriculture in their own country where this cereal is used for payments to cultivators. It can also be added that the Sudanese caravan trade is more important to the Tuareg than appears from
[435] the figures above. For salt is much more valuable than millet, and for one load of salt the Tuareg receive from four to fifteen loads of millet – in 1946 the price was fifteen to one (cf. Malaurie 1953, p. 344). It is evident that the Tuareg could not take all this millet back to Ahaggar. Most of it is re-sold

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in the Sudan for such articles as camel saddles, sandals, swords, millet mortars, indigo cotton, earthenware pots, and the like. The Tuareg may also buy quantities of butter and cheese for sale to the sedentary people of Tidikelt and for their own use in dry years.

The Sudanese trade constitutes the great stabilizing factor in the economy of pastoral Tuareg of Ahaggar. In return for the valuable rock-salt, pastoral Tuareg obtain the bulk of their agricultural food products (millet), butter and cheese for their own consumption in dry years, many important artefacts and notably their camel saddles and their millet mortars. They also get a surplus of millet and goods for investment in their Ahaggar gardens and for selling to the sedentary people of the Tidikelt oases.

There are certain Tuareg who do not engage in the Sudanese salt trade, notably those living in Ahnet; and these Tuareg nowadays have no irrigated gardens either. They acquire their necessary vegetable food products from Tidikelt (dates) and from Abalessa and Tamanṛaset (wheat). They buy these vegetable products with their surplus of goats, sheep, camels, butter and cheese, and an occasional barbary sheep. In a good year they can meet their needs of food in this way, but it is most difficult for them to subsist in dry years; and it may happen that two dry years come in succession. When I stayed among the Ahnet Tuareg in 1954–55, all camps visited were very short of food, while the Tuareg of the Ahaggar Massif who engage much in the salt trade (the *Dag Ṛali* and the *Aguh-en-tehlé*) possessed what they needed of wheat, barley, dates, and millet.

To-day there is a rather important market at Tamanṛaset where many Tuareg sell surplus livestock, and where they can also buy cereals and dates. But it is always profitable to sell livestock and meat in the Tidikelt oases where meat, butter and cheese are very expensive articles. Dates are cheap in these oases, European goods and woven blankets are also cheaper than at Tamanṛaset. The trading expedi-

Fig. 150. Wooden measure (*muda*) which contains one kilo of cereals, or the like. The Tuareg have adopted the kilogramme into their own weight system. The proper Tuareg unit is the *taẓiwa* which, according to Foucauld, corresponds to three kilogrammes (Foucauld 1951–52, III, p. 1160), but nowadays the Ahaggar Tuareg count one *taẓiwa* as equal to two kilogrammes and a half. The Tuareg have wooden or metal measures of *taẓiwa* size, and there are also larger measures to be used for grain, dates, and the like. For units smaller than *muda* the Tuareg sometimes use a wooden measure called *tanaḳast* which holds half a kilogramme. Smaller quantities are measured with the hand held half open, and it is recognized in Ahaggar that one *taẓiwa* corresponds to 99 handfuls. In Ayr it is very common to use a little plaited bowl (*téfakemt*) as the smallest unit of measurement. Dimension: 0.140 m high, 0.125 m in diameter at the rim. (F.M. 168).

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

tions have remained important to the Ahaggar Tuareg, and it is clear that they would not go on trading were these expeditions not profitable, for trading expeditions are extremely strenuous. Though the expeditions set off when the extreme heat is decreasing, it is still very hot in the extensive barren plains in autumn and in winter during daytime. Water and pasture are often extremely scarce in this deserted country, and the Tuareg frequently have to travel rapidly. For days or weeks they live so to say on their camels, and if camels are not too heavily loaded they may do up to 16 hours a day for several days in succession. Under such journeys the Tuareg eat only once a day. Obviously such trading expeditions are also very hard on the pack-camels, and there is always a risk of loosing a camel during such journeys through barren, desert country.

In this brief outline of caravan trading I have not considered those Ahaggar Tuareg living constantly in the Tamesna plains and adjacent regions. These Tuareg own more livestock than the Tuareg of the Ahaggar Massif, and I do not believe that they engage so much in extensive trading expeditions. They are comparatively rich in she-camels which are tolerably good milk yielders in these regions most of the year, and milk is more important as food than it is in Ahaggar. I believe that most Ahaggar Tuareg of the Tamesna region acquire their necessary vegetable products by selling surplus livestock, butter and cheese at the markets of Ingal and Agadez.

CARAVAN TRADING OF THE AYR TUAREG

Among the Ayr Tuareg stock-breeding products are far more important for food than in the north. Grazing conditions are better with annual pasture as a recurrent event, and the Tuareg keep bigger flocks of goats and sheep, larger camel herds, and most have a few zebus which are guarded without much difficulty. The *Kel Ferwan* Tuareg of Southern Ayr can live on milk for a large part of the year, though they, like those of Ahaggar, become tired of milk drinking if they get no solid food. There are Tuareg of Southern Ayr who live exclusively on milk for two or three months during the periods of *akasa* and *rarat* and to whom milk is important as food for at least six months. In the extremely hot season of *ewiten* when milk is very scarce most Tuareg eat millet porridge with a little milk or sauce (cf. p. 242 f.), and Tuareg who are not very wealthy eat millet porridge to a great extent all the year round, so that the necessary amount of millet for many camps is about 0.5 kilo a day per person, or about 180 kilos a year. In Ayr there are fairly good possibilities of collecting if there are not too many locusts, but most Tuareg do not collect a great quantity of wild seeds, and claim that they would be very badly off without millet, as seeds of wild plants are not very nourishing in comparison. In one year during the second world war (in 1943) they say that millet was very hard to get; it was then very difficult to subsist and a great many animals had to be killed for food. Millet is almost indispensable to the Tuareg; they also consume other vegetables derived from agriculture, notably wheat, maize, and dates, but millet is the most essential non-nomadic food product. Normally it can be acquired by most Ayr Tuareg without much difficulty.

The people of Ayr obtain their provisions of millet from the Sudanese area of shifting cultivation, notably from Damergu (Tanut). Millet can also be bought at Agadez whereto it is brought by Tuareg

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by the Tuareg of Ayr, the *Kel Geres*, and other Tuareg. The Tuareg obtain salt generally in exchange for millet, but they also bring with them dried meat, and meat from animals newly slaughtered; and although this meat is largely rotten when it arrives at Bilma it is easily sold to the oases dwellers who are yearning for meat. The oases dwellers have little to subsist upon but dates of which they have a surplus. This is purchased by the Tuareg, who get two loads of dates for one load of millet. The Bilma trade is less important nowadays than it was at the beginning of the century. In 1922 the Bilma caravans comprised about 7000 camels (Buchanan 1926, p. 83), while in 1908, when the trade was already decreasing, caravans numbered about 20,000 camels (Abadie 1927, p. 292). Caravans still go to Bilma to fetch salt and dates, but the salt trade is not so profitable to-day when Bilma salt can be bought fairly cheaply at Agadez, as the trucks bringing provisions from Agadez to the French administration and to the merchants of Bilma, take salt back with them when they return. The Ayr Tuareg do not organize their trading expeditions within family groups or sections as in Ahaggar. A Tuareg who does not want himself to go to Bilma may let a kinsman or a friend trade for him with his camels. The payment for this is a large loaf of salt which constitute one sixth or one seventh of a camel load.

The Ayr Tuareg do not generally obtain salt from the pits of Tegidda-n-tésemt though this place is not very far from the Massif to the west. They say that the Tegidda salt is not as good as Bilma's. The salt of Tegidda-n-tésemt is purchased mainly by the *Iwillemmeden Kel Dennek* when visiting the regions around Ingal after the rains. Some of the *Kel Ayr* who live in the extreme north (the *Kel Tédalé*, and others) occasionally go to Amadror in the north to fetch salt which is taken down to the Sudanese towns and villages. In years when drought prevails in Ahaggar these Tuareg take their surplus of livestock to the market at Tamanrasset, for in dry years the provision of meat, butter, and cheese consumed in Ahaggar come mainly from Ayr and adjacent regions. When I stayed in Ahaggar in 1954–55 a great many Tuareg of the *Kel Tédalé* came to Tamanrasset to sell camels, donkeys, sheep, goats, and zebus, and also brought with them large quantities of cow's butter and cheese. The route followed from Northern Ayr to Ahaggar runs via I-n-azawa and I-n-abeggi which are the only wells between the two mountain massifs. Water is very scarce and so is pasture, which is mainly limited to a scattered vegetation of annual plants; over very large areas there is no vegetation at all. It is easy to drive camels and donkeys through these regions, while more difficult for sheep, goats, and cattle. The zebus easily get cut hooves from walking on stony ground, while sheep and goats suffer much from thirst. In spite of this, all kinds of livestock can be driven through the barren desert from Ayr to Ahaggar, even as late as the month of March which is extremely hot in the barren desert country. The Tuareg frequently lose animals which die from thirst and hunger during the journey, but the trade is nevertheless extremely profitable as prices of livestock are high in Ahaggar in dry years, while prices of European goods such as tea, sugar, cotton, metal vessels, and the like are extremely low compared with the prices asked for these goods in Ayr.

The Ayr Tuareg, though owning more livestock than the Tuareg of Ahaggar, have a certain demand of agricultural food products. These products are mainly grown outside of the Massif, for the farmers of Ayr grow little millet, very few dates, and part of the wheat grown in Ayr is exported to the oases of Ganet and Rat in the north. Though these vegetable products can be purchased at Agadez, it is profitable to fetch them where they are cheap, namely in the Sudan (millet) and in Bilma (dates). And

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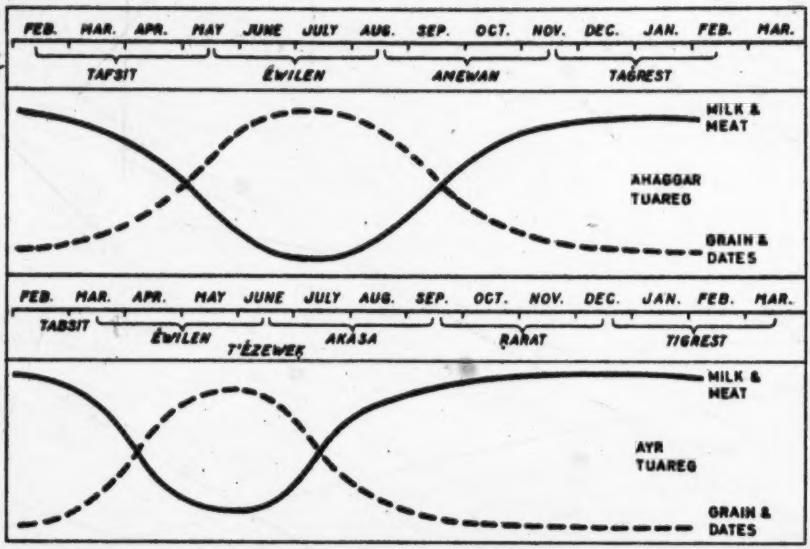

Fig. 151. The relative importance throughout the year of food derived from stock-breeding and vegetable products mainly comprising agricultural products. The curves describe conditions in good years for wealthy families. However, milk (and meat) is less important to most Ayr families than indicated in the diagram which covers a household making use of the particular type of annual pasture which remains green throughout winter, notably *alwat* (*Schouwia purpurea ssp. Schimperi*) *adreylal* (*Astragalus Vogelii*), and *tagellet* (*Colocynthis vulgaris*). – This diagram should be compared with Fig. 14 where climatic and botanical changes throughout the year are outlined.

it is remunerative to buy an extra supply of millet in Damergu and to exchange it for dates and salt at Bilma. Caravan trading is a source of profit to the Ayr Tuareg, but most of them ultimately acquire their agricultural food products in exchange for stock and stock-breeding products. Very few of them mine salt at Amadror, and most of them obtain salt in return for millet bought for domestic animals in Damergu, or for meat of domestic animals butchered in Ayr. The Tuareg cannot easily subsist without agricultural products but they can obtain them in exchange for their livestock.

We see again that conditions of stock-breeding are very favourable in Ayr in comparison with those of Ahaggar and in Tasilé-n-Ajjer, where frequent drought periods make it difficult for the Tuareg to exist. It is easily understandable that the favourable grazing conditions of Ayr have caused many Tuareg of the north to migrate southwards. These migrations take place even to-day and have gone on for centuries (cf. p. 411 ff.). However, even in Ayr it is most difficult to subsist without cultivated cereals (millet), and we must do away with the myth that pastoralists of North Africa live entirely on milk and meat from their animals – they do not. This is true for all Tuareg I have visited, including

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those of Tasilé-n-Ajjer and the *Kel Geres*. I have been informed by *Iwllemmeden* Tuareg of the *Kel Dennek* group, whom I met in Ayr, that they live on millet to much the same extent as the Ayr Tuareg, and that some of them have gardens cultivated by negroid agriculturists. For the *Kel Dennek* it is expressively stated by Nicolas that they cannot live on milk, that they kill comparatively few of their animals, and that they largely live on cereals obtained not only by collecting. Some of the Tuareg mentioned by Nicolas are described as semi-nomads (Nicolas 1950a, p. 145 ff.). Among the Southern Tuareg living further west in the Sudanese savannahs (the *Iwllemmeden Kel Ataram*), agricultural products are very important to the pastoralists who may possess gardens along the banks of the Niger, these gardens being cultivated by the *Bélla* (Aymard 1911, p. 117; Miner 1953, p. 60 ff.).

Nowadays there are no Tuareg who subsist without agricultural products, a few of them (the *Kel Ajjer*) practise a primitive type of agriculture in the river valleys, and within all groups there seem to be Tuareg who have turned to irrigation farming as their most important occupation. In the following section I discuss briefly the subject of Tuareg economy in the past.

TUAREG ECONOMY IN THE PAST

Tuareg culture was not profoundly altered by the advent of European military administration around the beginning of the present century. Their traditional material culture has persisted largely unchanged up to the present day. The major change has been the abolition of warfare and consequently the breakdown of the traditional political system, but the abolition of warfare also led to important changes in the organization of caravan trading.

Raiding expeditions were carried out in some Tuareg groups even after the arrival of the Europeans, who established small garrisons in the oases and had camel patrols roaming the country as they have nowadays. Buchanan thus describes a raid carried out by Ahaggar Tuareg against the Ayr village of Timia in the year 1920 (Buchanan 1921, p. 207 ff.), and raids have not been entirely unknown in Ayr even later, though the raiders have then been severely handicapped by the establishment of the French wireless stations which enabled the camel patrols of different areas to communicate with each other (Rodd 1926a, p. 188). Raiding have nowadays stopped, but before the European penetration and conquest it was so to speak an industry to be mentioned with other subsistence activities.

The Ahaggar Tuareg were known as prominent raiders and warriors in the past. The two dominent chiefdoms within the group of Ahaggar Tuareg, the *Kel Ḍela* and the *Taytoḳ*, frequently raided the *Iwllemmeden* Tuareg and the Arabs living north of Timbuktu, as these southern pastoralists were very rich in livestock and in slaves. Some of these Tuareg and Arabs even paid fixed dues to chiefs of the *Kel Ḍela* and the *Taytoḳ* in order that they should not be raided by Tuareg of these groups. However, these annual payments did not safeguard against raiding (cf. p. 401 f.). It seems as if the south-bound raiding expeditions were mainly profitable to the Ahaggar Tuareg, who could not so easily be raided in return by the Southern Tuareg. The Ahaggar Tuareg also raided other neighbouring pastoralists such as the Tuareg of Tasilé-n-Ajjer, and the powerful Arab tribe *Ulad Ba Ḥammu* with whom they had frequent and very serious quarrels; these people raided the Ahaggar Tuareg in return. It can be

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1888, p. 21 f.). Duveyrier says that among the *Kel Ajjer* all noble Tuareg had slaves, while only some of the vassals were slave owners. He says that slaves were bought and sold in towns (Duveyrier 1864, p. 339). Information about the Tuareg slave trade is given by Richardson, who undertook his journeys mainly to collect material on slavery which is described throughout his journals. According to Richardson's descriptions there can be little doubt that the Tuareg engaged in the slave trade, but I think that perhaps his statements are tinged by his deep antiphathy to slavery (cf. Richardson 1848, I–II & 1853, I–II). It is most possible that the Tuareg slave caravans he mentions were organized by Arab merchants of Ṛat and Ṛadames. The former engagement of pastoral Tuareg in the slave trade has also been mentioned by Lyon (Lyon 1821).

As to Tuareg caravan trade throughout the 19th century, we can add that all Tuareg tribes did not trade to the same extent. Within most groups there were certain tribes of particular classes which did not go in so much for warfare and raiding, but were keen traders. This was true of tribes of the *Isəkkemaren* class in Ahaggar, and in Ahnet there were two Arab tribes allied with the drum-group of *Taytoḳ*, namely the *Sekakna* and the *Mazil* who were responsible for the very important trade with Timbuktu (Bissuel 1888, p. 24). Among the *Kel Ajjer* the *Iforas* tribes traded on a much larger scale than other tribes (Duveyrier 1864, p. 359 ff.). In Ayr the same was true of certain tribes of the *Kel Ewey* group.

However, throughout the 19th century all Tuareg, with the exception of those of the nobility, engaged in caravan trading which played a great part for the pastoralists, providing them with cereals and dates necessary for their subsistence. Already in this century certain pastoralists had taken up irrigation agriculture, and some of them practised a very primitive type of agriculture, but vegetable products were acquired mainly through caravan trading.

[text continues on p. 221]

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634 vassals was given to the drum-chief (the *Amenukal*) and not to the *temaẓlayt* master. However, should
565 a vassal Tuareg have borrowed for raiding a riding camel from his *temaẓlayt* master or another noble
571 Tuareg, they received a tribute also known as *abellağ*, comprising half of the booty remaining when
613 one half had been given to the *Amenukal*.
721

565 The noble Tuareg possessed many advantages over their individual vassals. They could apparently
571 claim almost what they wanted for their subsistence, and frequently camped close to their vassals who then were obliged to feed them, and when in need of riding camels the noble Tuareg could freely take such animals from their vassals (Duveyrier 1864, p. 334 ff.). Similar information is given by Benhazera, but he states that the vassals in the past would not necessarily supply everything demanded by their noble lords (Benhazera 1908, p. 54). The vassals were under a particular obligation to provide the noble Tuareg with goat-breeding products, and if they had milk yielding she-camels the noble Tuareg could claim these animals until milk-yielding stopped. But the vassals had also many advantages from the *temaẓlayt* relationships. They were not only protected by their lords. The noble Tuareg would leave behind the animals they could not take with them when roaming in the desert, and noble Tuareg never had much livestock with them in their camps. It was also of great importance to the vassals that they could use their masters camels for caravan trading. On the whole the system was not exclusively the exploitation of vassals by the noble Tuareg, and it can be added that the vassal Tuareg were always more numerous than the noble Tuareg, that the drum-chief (the *Amenukal*) was elected by the vassals, and that he alone had judicial rights. The system was one of give and take to both classes involved, and there can be little doubt that it was well adapted to practical ecological conditions.

233 In Ahaggar, camels and goats are very complementary to each other. The camel supplies the Tuareg
●433 with milk, but with very few other products, and the Tuareg cannot always get milk from their she-
[234] camels which yield very little when pastures are dry. When grazing is good, camel's milk is important
[262] as food, but it is not well-fitted for churning butter, and cannot be used for cheese. Camels are occasionally killed, but as their meat is not very suitable for drying, the Ahaggar Tuareg kill camels to
[281] utilize their meat only when many people congregate, as for instance at a marriage. Camel's hide is not very important in Tuareg craft, for tanning is not practised, and Tuareg camels have little hair which is used only for the manufacture of a few insignificant objects. To most Ahaggar Tuareg the
[437] camels have little direct economic value. But for raiding in the past, camels were very valuable riding animals, and were then, as now, extremely important for caravan trading which provides the Tuareg with most of their vegetable food.

The economic rôle of goat-breeding is very different. Goat-products play a very comprehensive
[234] part in Tuareg nourishment. Goat's milk is not only drunk, but is also made into butter and cheese
[262] which can easily be stored. Goat's meat is superior to camel's meat, and one goat does not contain more meat than can be eaten quickly by the members of a normal household. Furthermore, goats are very important in Tuareg craft; tents, waterbags, and containers for different sorts of liquid and solid food are made predominantly from their skin, which was formerly also employed for whole garments. Goat's hair is extremely useful as material for ropes with which domestic animals are tethered, camel-loads are fastened, and the like.

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Pastoral Tuareg could not survive in Ahaggar without goats. They might be able to subsist without camels, which can be replaced by donkeys as beasts of burden. But camels make life much easier to the Ahaggar Tuareg, who nowadays, as in the past, base their economy mainly on camels and goats. I think it is fairly correct to say that most Ahaggar Tuareg get their milk-food from goats and their vegetable food from caravan trading with the aid of camels.

Formerly, the true vassal Tuareg of Ahaggar were not allowed to possess camels, which were owned exclusively by noble Tuareg. Foucauld says that 100–150 years ago the vassals had no camels, but he does not mention his source of information (Foucauld 1951–52, II, p. 534). It is, however, confirmed by many Tuareg that the vassals originally had no camels, and that throughout the 19th century they had not many camels, while they were rich in goats of which the noble Tuareg had very few. Goat products were given to noble Tuareg by vassals, and even to-day goats and butter form part of the *tiwsé*-payments. The noble Tuareg, on the other hand, allowed their particular vassals to trade with their camels against the payment of a certain amount of vegetable food products which to-day also form part of most *tiwsé*-payments. They allowed their vassals also to have usufructs of such animals as could not be taken with them on their migrations. Noble Tuareg of to-day continue to claim food products and the like from their vassals. Poor noble Tuareg frequently ask gifts of the vassals, and there are even noble Tuareg who temporarily camp close to rich vassals from whom they obtain part of their food. Vassals may also lend their she-camels to noble Tuareg, who will return the animals when milk-yielding stops; this is considered an old privilege of the nobility. The noble Tuareg of to-day may ask vassals to render them minor services as, for instance, to guard domestic animals or to look for animals lost in the desert, and one noble Tuareg told me that he had camels guarded by vassals. But nowadays the noble Tuareg have no rights over their vassals, who can refuse any gift or service demanded by noble Tuareg, and there are even noble Tuareg who wear amulets which are believed to induce vassals to donate the things required.

It would seem that the economic relationships forming the basis of the Tuareg political system in the north would arise so to speak automatically from two distinct cultures which met each other in the desert: a camel-breeding culture of a Berber-speaking people now known as the noble Tuareg, and a goat-breeding culture of an ancient Berber-speaking population which now constitutes the vassals.

Some Tuareg traditions seem to indicate that political systems based on class-division arose in this way in the north, but we have to admit that other traditions contradict this. Below I attempt to elucidate Tuareg history in Ahaggar by means of native traditions to which, for practical reasons, I allot definite numbers.

Tradition A. All Tuareg have a common origin as they descend from a woman named *Lemtuna*, who is also the ancestress of certain Berbers living around Radamas in Tripolitania. Most Berbers of Morocco descend from *Lemtuna*'s sister who became the ancestress of the *Beraber*. This tradition is widely known in Ahaggar.

Tradition B.I. This tradition is a very common explanation of the origin of the class-division in Ahaggar: Long ago two Islamic women of the *Beraber* immigrated to the oasis of Silet from Tafilelt in Morocco. One of these women named *Ti-n-Hinan* was noble while the other woman named *Takama*

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173 565 tradition according to which some of the *Isebeten* formerly engaged in agriculture in Ahaggar (Foucauld 1951–52, II, p. 535). The *Isebeten* spoke a Tuareg dialect different from that spoken to-day. [172] Numerous prehistoric survivals draw attention to the mode of livelihood of the ancient *Isebeten* people. A huge tomb at the foot of the Asekrem mountain is said to contain the remains of their supreme chief, *Akkar*, and the Tuareg say that the large stone pestles (cf. Fig. 200) commonly found in Ahaggar, were used by the *Isebeten*. The existence of the *Isebeten* in Ahaggar is a fact, besides, two men known as *Mokhammed ag-Kerku* and *Émenni ag-Khedidda*, both members of the *Dag Ŗali* tribe, are said to descend patrilineally from the *Isebeten*. Tuareg of the *Dag Ŗali* claim that their tribe descends from the *Isebeten*, or is very closely related to it, so that the ancient population of *Isebeten* formed the ancestral tribe of the oldest vassals *Dag Ŗali* (*Kel Ahnet*) and *Ayt Lowayen*. These *Isebeten* were conquered by the ancestors of the noble Tuareg who came to Ahaggar at a later date and introduced the camel.

It is striking that this tradition about the origin of the oldest Ahaggar vassals from the ancient *Isebeten* contains no mythical elements, and I believe that it holds an element of truth, the more so as it explains the origin of the class division in a quite natural way. Dr. Vycichl has tried to connect the word *Isebeten* with the name of a Libyan tribe *I-s-b-t-u* mentioned in Egyptian accounts, according to which the tribe was exterminated by Rameses III (cf. Lhote 1955a, p. 145). However, there is no reason to speculate about the name in this way, as it can be explained more naturally without much [551] difficulty. For the word *Ésebet* is very frequently used as a personal name of women in the *Dag Ŗali* tribe so that it would seem natural to interpret the name *Isebeten* as "a group of people descending from the woman *Ésebet*". If this interpretation is correct it would seem that the ancient *Isebeten* had [114] [428] a system of matrilineal succession. Lhote has stated that certain hunting territories in the *Dag Ŗali* tribe are inherited in the paternal line by people who descend from the ancient *Isebeten* (Lhote 1955a, p. 144 f.) but this is not in agreement with my own investigations, which show that the two men said to descend patrilineally from the *Isebeten* have no rights over hunting-territories.

174 614 565 The cultural features said to have been characteristic of the ancient *Isebeten* are to a large extent conserved even nowadays in the *Dag Ŗali* tribe. These vassals, like other true vassals of Ahaggar, are known by the name *Kel Ulli*, that is "the goat people", or by the name *Imŗad* which perhaps also refers to goat-breeding for, according to Nicolas, the word is related to *eŗeyd* meaning "a kid" (Nicolas [433] 1950a, p. 189). We can add that even to-day the subsistence activities of the true vassals centre mainly around goat-breeding, with hunting and collecting as subsidiary occupations. Hunting is particularly [224] important to the *Dag Ŗali*, descendants of the *Isebeten* and living within the same territory as did this ancient people.

173 565 As to the arrival of the noble Tuareg, comprising the *Kel Ŗela* and the *Taytoḳ*, said to descend from *Ti-n-Hinan*, there is some evidence that they did not constitute the oldest noble Tuareg settling in Ahaggar. The tradition of their descent from *Ti-n-Hinan* claims that these noble Tuareg came from Tidikelt in Morocco, that they descended from the *Beraber*, and that they were Islamic. The claim that they were Islamic cannot be easily reconciled with the view that their ancestress was buried in the large tomb or fort at Abalessa, for this huge building is beyound doubt pre-Islamic. I think it possible that the tribes said to descend from *Ti-n-Hinan* were Isamic when they immigrated to Ahaggar.

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Hahn, who was the first to write in detail on the historical origin of subsistence activities, stated as his view that cultures based exclusively on stock-breeding were recent and were preceded by mixed farming cultures (Hahn 1896, p. 31 f.; 1905, p. 131; 1908, p. 19). Though some of Hahn's arguments in favour of this theoretical conception are difficult to accept, his general view that pure stock-breeding did not form a general stage in the evolution of culture is recognized by many scholars who hold that cultivation is everywhere older than stock-breeding. Forde long ago pointed out the great instability of pastoralism and its dependence upon grown cereals (Forde 1950 (1. ed. 1934), p. 403 f.), and in a very recent study, published in collaboration with Mary Douglas, it is stated that "Pastoral nomadism which is popularly believed to have preceded the development of agriculture actually appeared at a later stage in the Old World on the fringes of settled populations used to cultivation with the rearing of livestock" (Forde 1960, p. 330). Important contributions to the solution of the problem of the origin of stock-breeding have also been made by Childe, who says that in practically all the oldest food-producing settlements examined by archaeologists in Europe, Hither Asia, and North Africa, the basic industry is mixed farming (Childe 1936, p. 85). Childe does not explicitly claim that pastoral stock-breeding derived from a mixed farming culture, because pastoralists are not likely to leave many vestiges by which the archaeologists can recognize their presence (Childe 1936, p. 91). But Childe's general view seems to be in favour of origin of pastoral stock-breeding from a culture which knew farming, and he points out "that ancestors of our farmyard animals lived wild in most of the regions that seem likely to have comprised the cradle of grain-growing" (Childe 1936, p. 86).

In my description of Tuareg ecology I have indicated the great importance of agricultural products for food among true pastoralists, both in Ahaggar and in Ayr. I believe that the latter Tuareg and the Tuareg of the Sudanese savannah could perhaps subsists without cereals grown by agriculturists, though it would not be so easy for them. The Ayr Tuareg around Agadez admit this and refer to their great difficulties in subsisting during one year of the second world war when millet was scarce. Most African pastoralists acquire provisions of cultivated grain for their food during periods when milk is scarce, and the general conception that African nomads live mainly on milk and meat is not valid. However, we cannot state that all pastoralists are dependent on agriculture for food, for a few people seem to subsist on stock-breeding products and on wild seeds. Thus Seligman describes from the Beja a tribe named Bedawib which differs from other Beja groups in that its members have no camels and do not eat agricultural food:— "The Bedawib do not cultivate at all and it is said that they would not touch grain even if it were given to them so that they live almost entirely on milk and meat". (Seligman 1913, p. 599 f.). Other pastoralists of the so-called East African Cattle Complex eat cereals grown by themselves or by neighbouring agriculturists, but agricultural food-products play a very little part to some of these people (cf. Lowie 1938, p. 314), and the Hottentots live by cattle-breeding supplemented by hunting and collecting (cf. Schapera 1930, p. 235). The argument that stock-breeding cultures cannot exists except in a kind of symbiosis with agriculture is not valid, but agricultural food-products make life easier for pastoralists who cannot subsist on milk all the year round. For we must bear in mind that in an arid or semi-arid country conditions of collecting are changeable, and it is also important to note that wild seeds are generally far less nourishing than are grown cereals. Even in the savannah country it is a great advantage for pastoralists to have access to grown cereals, and

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433 pastoralists who live in the true desert country could hardly live without agricultural food-products.
262 In dry years the Ahaggar Tuareg subsist almost exclusively on wheat, millet, and dates. They cannot
171 in such years live on milk and meat, and collecting is of no importance, as the plants suitable for collecting do not germinate with the exception of a few species which are of very little value. In very arid countries agriculture seems to be necessary for the subsistence of pastoralists, and it is of great value also to pastoralists who live under more favourable conditions.

433 Partly owing to the decline of caravan trading, there are pastoralists who have recently taken up
178 agriculture in connection with irrigation. We have also mentioned that the Tuareg of Tasilé-n-Ajjer
171 engage in a kind of primitive agriculture in the river valleys after heavy rain, and we know from literature that this method was also practised in Ahaggar before the introduction of developed irrigation systems. We have seen that throughout the northern parts of the Sahara a connection between shifting cultivation and pastoralism is the rule rather than the exception. Primitive corn growing is, in fact, practised among many other pastoralists besides the Northern Tuareg, and the bedouins who sow wheat and barley by means of the plough or the hoe further north on the outskirts of the desert. In Southern Mauretania certain nomads grow millet and water melons in the river valleys which are annually flooded. Sowing is done mainly where the valleys broaden, small dams being constructed to detain water. This cultivation method is also applied by certain pastoral *Zenaga* (cf. Capot-Rey 1953a, p. 277), who are, perhaps, descendants of the ancient *Sanhaja* Tuareg who lived in this country before the Arab conquest. There are also pastoralists of the Beja people who engage in agriculture when living close to rivers. The Bisharin who camp around the Atbara River grow melons in the wet sand (Baker 1867, p. 38), the Hadendoa pastoralists, when camping close to the Gash River in the dry season, grow millet and other cereals (Seligman 1913, p. 599), and agriculture is also practised in the same region by pastoral Beni Amer (Munzinger 1864, p. 332).

A journey from the Mediterranean coast takes us from people who live mainly by agriculture (e.g., the Kabyle) to people who live by mixed farming as semi-nomads (e.g., the Chawiya), to people who are roaming pastoralists but practise shifting cultivation when possible and fairly regularly (e.g., the Ulad Naïl, the Larba, and other Arab pastoralists on the outskirts of the desert), and, finally to the true desert nomads where agriculture is practised on a very small scale (e.g., the *Kel Ajjer*) or not at all (e.g., the *Kel Ahaggar* and the Chamba). It would thus be natural to explain the development of true pastoralism in Northern Africa as an adaption of a mixed farming culture to environment, and this view seems to have been adopted by several authors (Frobenius 1904, p. 154 f.; Steensby 1908–09, p. 285; Wölfel 1941, p. 89–140; Herzog 1956, p. 210–223).

174 The question of the origin of North African pastoralism can only be answered by a deeper knowledge of history, and the answer is not easy to find. Historical sources do not reach far back in North Africa. We know that throughout the Middle Ages the people who lived on the borderland of the Northern Sahara south of the Atlas and along the Mediterranean coast possessed an economic system much like that prevailing nowadays. Ibn Khaldun describes the economic life of the *Sanhaja* Berbers, who lived in the country between Tunis and Cairuan, saying that they are cow and sheep breeders who also engage in agriculture (Ibn Khaldun III, p. 225). Of an Arab tribe called Azza of Cyrenaica, he says that though its members are plough cultivators they also lead their domestic animals into the